

DESCRIPTION AMENDMENTS

Rewrite the paragraph beginning on page 1, line 3, to read as follows:

BACKGROUND OF THE INVENTION

The invention relates to a method of cutting a sheet-like piece by utilizing camera means and a controllable cutting apparatus ~~in accordance with the preamble of claim 1.~~

Rewrite the paragraph beginning on page 2, line 1, to read as follows:

~~The aim of the invention can be achieved as is described in claim 1 and in the other claims.~~

Rewrite the paragraph beginning on page 2, line 4, to read as follows:

SUMMARY OF THE INVENTION

According to the invention following measures are taken: the piece to be cut is placed on a cutting surface located within the recording area of camera means, the piece is photographed by the camera means and on the basis thereof the outlines of the piece are determined and the information on the outlines of the piece is input into the positioning system, where the cutting paths are established and input into the control system of the cutting machine, which determines necessary parameters for the cutting and on the basis of these, controls the cutting of the piece into parts according to given instructions. Thus, the invention enables the use of machine vision for defining the sheet blank so as to provide and implement a cutting program. Preferably, also automation may be applied to the positioning of the pieces to be cut on the remnant sheet. Thus the invention enables an economical utilization of remnant sheet material in the positioning the pieces to be cut, and minimizes manual work and the scrub percentage of the remnant sheet material. Here, the outlines of the piece also refer to the shape of such parts of the pieces, e.g. openings, which remain inside the piece. Also, the invention is preferably applicable to the utilization of remnant sheet objects, which are irregular in shape, in a most optimal way.

Rewrite the paragraph beginning on page 3, line 31, to read as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

In the following the invention is described by way of example with reference to the attached drawings, in which

Figure 1 shows a functional diagram for utilizing remnant material in the manufacture of sheet objects; and

Figure 2 shows a positioning layout.

Rewrite the paragraph beginning on page 4, line 7, to read as follows:

DETAILED DESCRIPTION

In a machining arrangement 1 according to Fig. 1, i.e. in this case thermal cutting, an image of the cutting area 3 of a cutting apparatus is provided by camera means 2 to be attached to a cutting machine, to a separate guide rail or to structures surrounding the machine. The shape and dimensions of the outlines of a sheet blank 4 comprising a remnant sheet and located within the cutting area 3 are determined by means of the image provided by the camera. The sheet blank 4 is placed on a cutting surface 5, which may comprise for instance a floor or a machining table. The determination of the dimensions may be performed by software according to software algorithms or manually by the operator by pointing at the display. As ancillary equipment for the determination an illumination and a light source to be reflected, preferably a helium-neon laser bar, may be used for facilitating the detectability. The result of the determination is data, i.e. so-called image data 6, including the dimensions of the outlines of the sheet blank 4 and its location in the working area 3, which data is transferred over to a positioning system 7, where a desired number of certain type of small parts is placed on the area. For instance a certain type of a small part may be selected from the macro-library and the positioning program may be arranged so as to fill the sheet blank with said parts. Alternatively, also the operator himself may draw by the program a small part having a desired shape and place a certain number of these parts on the sheet blank, and if desired, a certain number of some other kinds of small parts, if there is still open space on the sheet blank. The

positioning data is then input into the control system of the cutting apparatus, which actuates a cutting program 8.